Diagrammatic and Graphic Presentation

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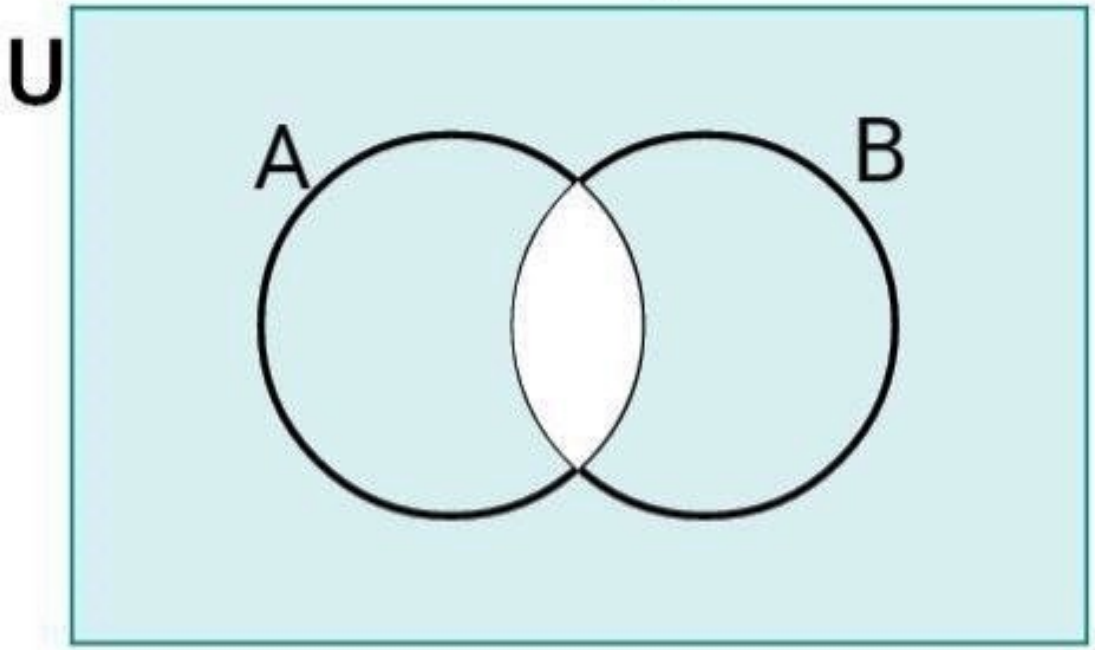
Need of Statistical Diagrams or Graphs

- Numerical data when presented in the form of a tabular column may not be easily understood by a common man. Numbers are not interesting to all. To many, they are dull and confusing. Hence it is necessary to adopt a method which would present the numerical data in a way that is at once comparable and appealing both to the eye and the intellect.
- For this purpose, statistical diagrams or charts or graphs are made use of. Diagrams carry with them the merits of attraction and effective impression. Diagrams render the data readily intelligible. They save much valuable time which would otherwise be lost in grasping the significance of numerical data.

Venn Diagrams



☐ $A \cap B$ ☐ A' ☐ $B \cap A'$

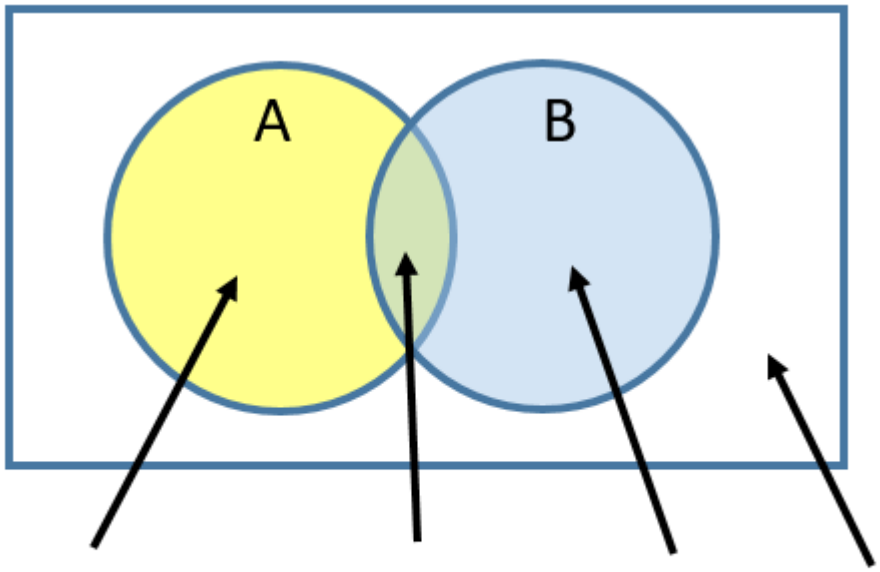
☐ $A \cup B$ ☐ B' ☐ $(A \cap B)'$

☐ $A \cap B'$ ☐ $(A \cup B)'$

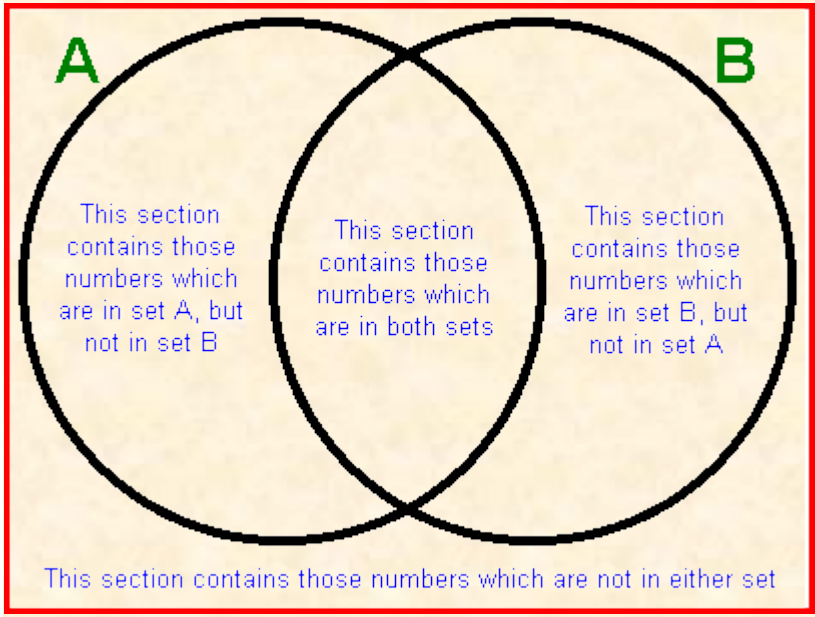
Venn Diagram

- A **Venn diagram** is an illustration that uses circles to show the relationships among things or finite groups of things. Circles that overlap have a commonality while circles that do not overlap do not share those traits. **Venn diagrams** help to visually represent the similarities and differences between two concepts.

Venn Diagram



Objects here are in set A but not set B	Objects here are in both sets A and B	Objects here are in set B but not set A	Objects here are not in set A or set B.


A
B
This section contains those numbers which are in set A, but not in set B
This section contains those numbers which are in both sets
This section contains those numbers which are in set B, but not in set A
This section contains those numbers which are not in either set

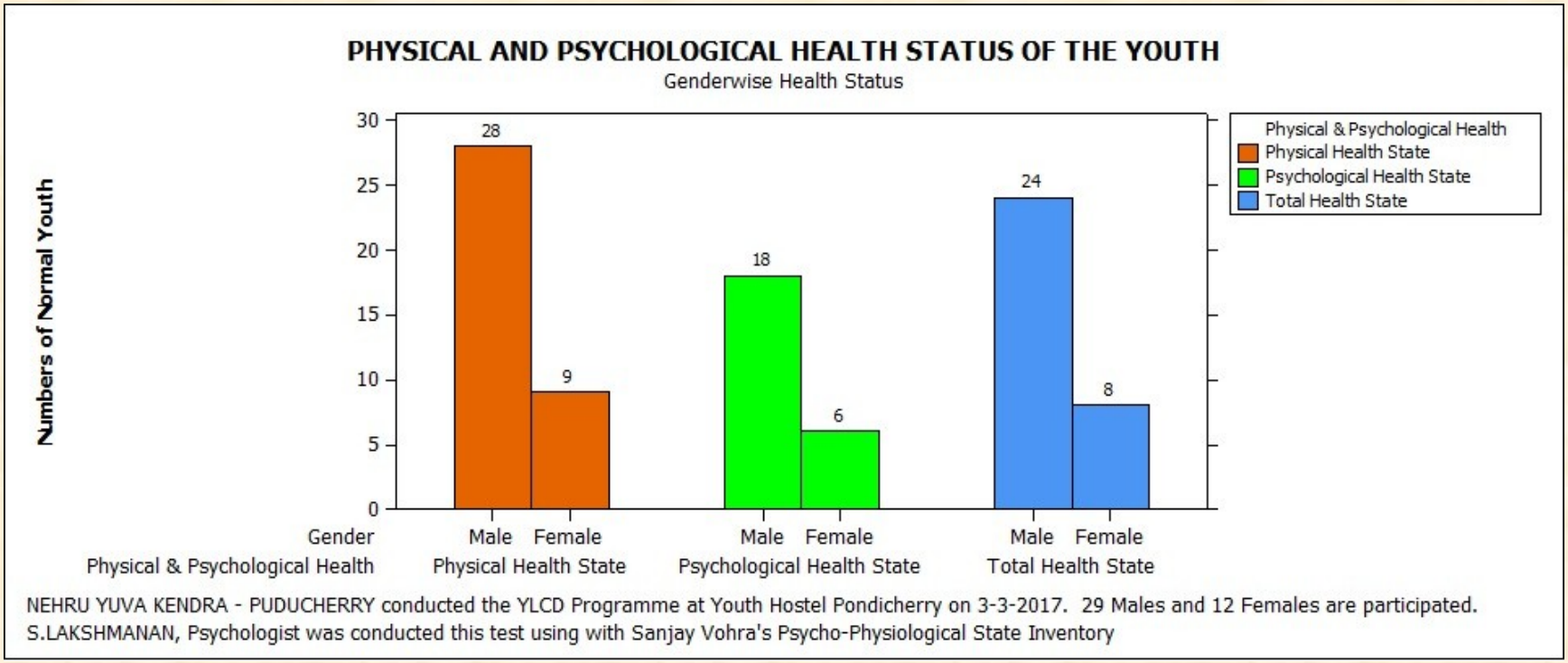
What is a Venn Diagram

- A Venn diagram is an illustration that uses circles to show the relationships among things or finite groups of things. Circles that overlap have a commonality while circles that do not overlap do not share those traits.
- Venn diagrams help to visually represent the similarities and differences between two concepts. They have long been recognized for their usefulness as educational tools. Since the mid-20th century, Venn diagrams have been used as part of the introductory logic curriculum and in elementary-level educational plans around the world.

KEY TAKEAWAYS

- A Venn diagram uses circles that overlap or don't overlap to show the commonalities and differences among things or groups of things.
- Things that have commonalities are shown as overlapping circles while things that are distinct stand alone.
- Venn diagrams are now used as illustrations in business and in many academic fields.

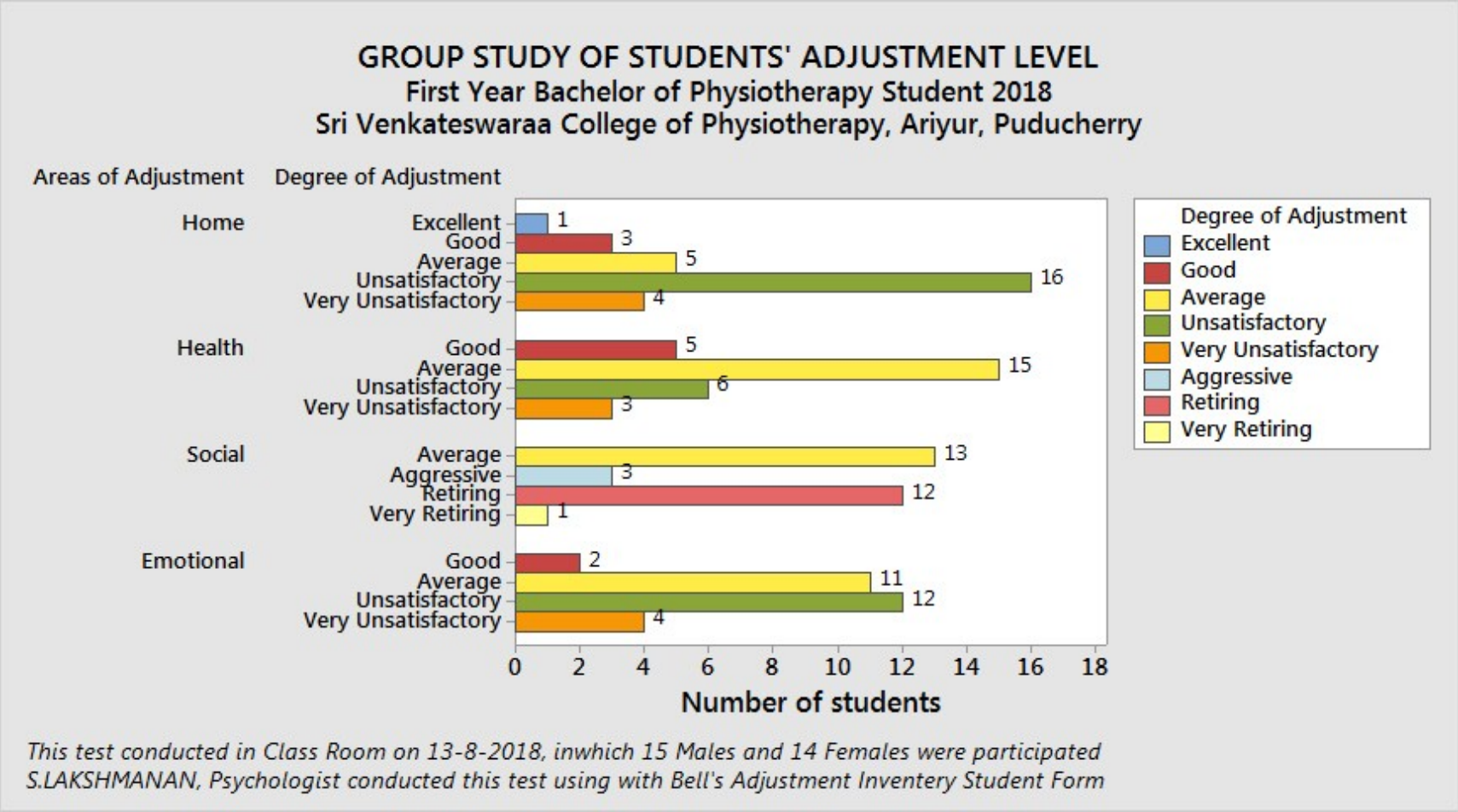
BAR DIAGRAM


PHYSICAL AND PSYCHOLOGICAL HEALTH STATUS OF THE YOUTH
Genderwise Health Status
Numbers of Normal Youth
30
25
20
15
10
5
0
28
9
18
6
24
8
Physical & Psychological Health
Physical Health State
Psychological Health State
Total Health State
Gender
Male
Female
Physical & Psychological Health
Physical Health State
Psychological Health State
Total Health State
NEHRU YUVA KENDRA - PUDUCHERRY conducted the YLCD Programme at Youth Hostel Pondicherry on 3-3-2017. 29 Males and 12 Females are participated.
S.LAKSHMANAN, Psychologist was conducted this test using with Sanjay Vohra's Psycho-Physiological State Inventory

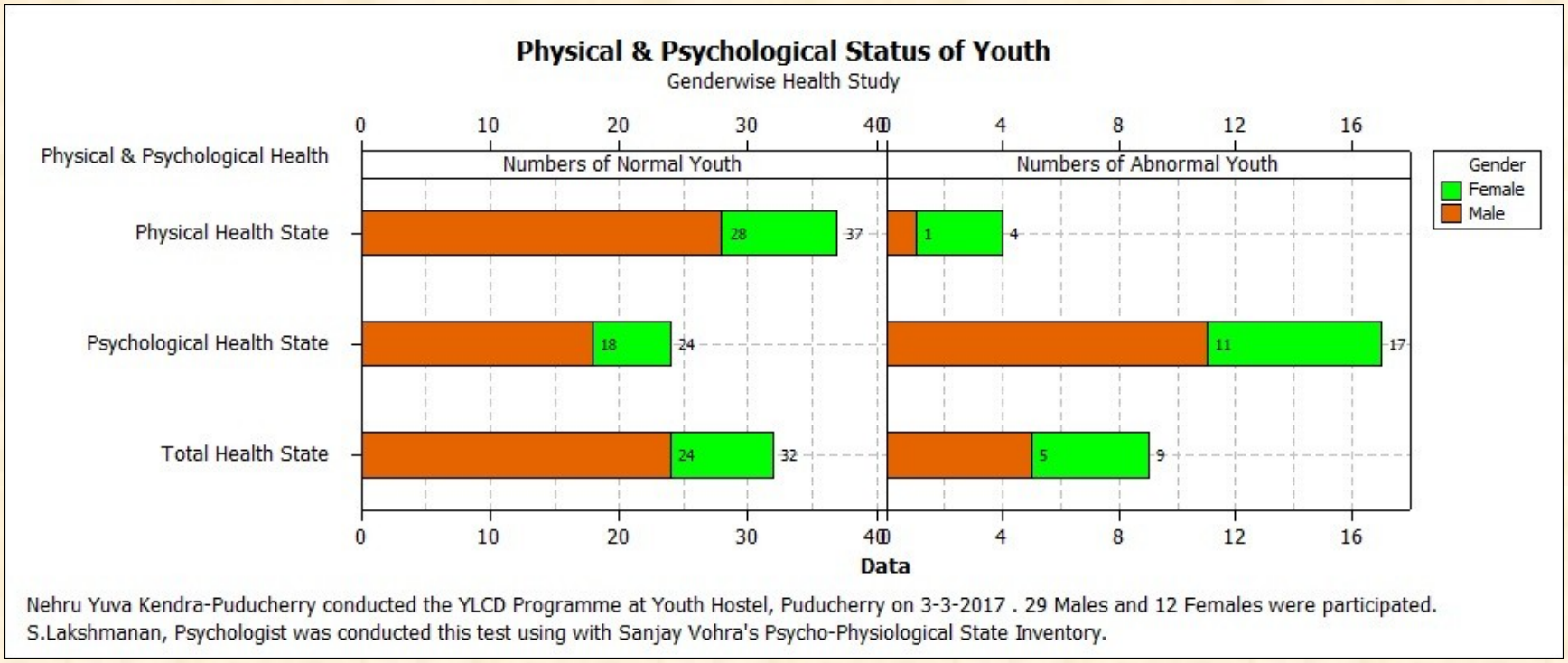
BAR DIAGRAM

- The bar diagram is the simplest of statistical diagrams. It consists of a number of rectangles of equal width and of lengths proportional to the magnitudes of the variables that they represent. The rectangles can be either horizontal or vertical. They all stand on the same base line and are separated from each other by equal intervals/ bar diagrams are suitable for representing spatial series.

BAR DIAGRAM


GROUP STUDY OF STUDENTS' ADJUSTMENT LEVEL
First Year Bachelor of Physiotherapy Student 2018
Sri Venkateswaraa College of Physiotherapy, Ariyur, Puducherry
Areas of Adjustment
Degree of Adjustment
Home
Excellent
Good
Average
Unsatisfactory
Very Unsatisfactory
1
3
5
16
4
Health
Good
Average
Unsatisfactory
Very Unsatisfactory
5
15
6
3
Social
Average
Aggressive
Retiring
Very Retiring
13
3
12
1
Emotional
Good
Average
Unsatisfactory
Very Unsatisfactory
2
11
12
4
0
2
4
6
8
10
12
14
16
18
Number of students
Degree of Adjustment
Excellent
Good
Average
Unsatisfactory
Very Unsatisfactory
Aggressive
Retiring
Very Retiring
This test conducted in Class Room on 13-8-2018, inwhich 15 Males and 14 Females were participated
S.LAKSHMANAN, Psychologist conducted this test using with Bell's Adjustment Inventery Student Form

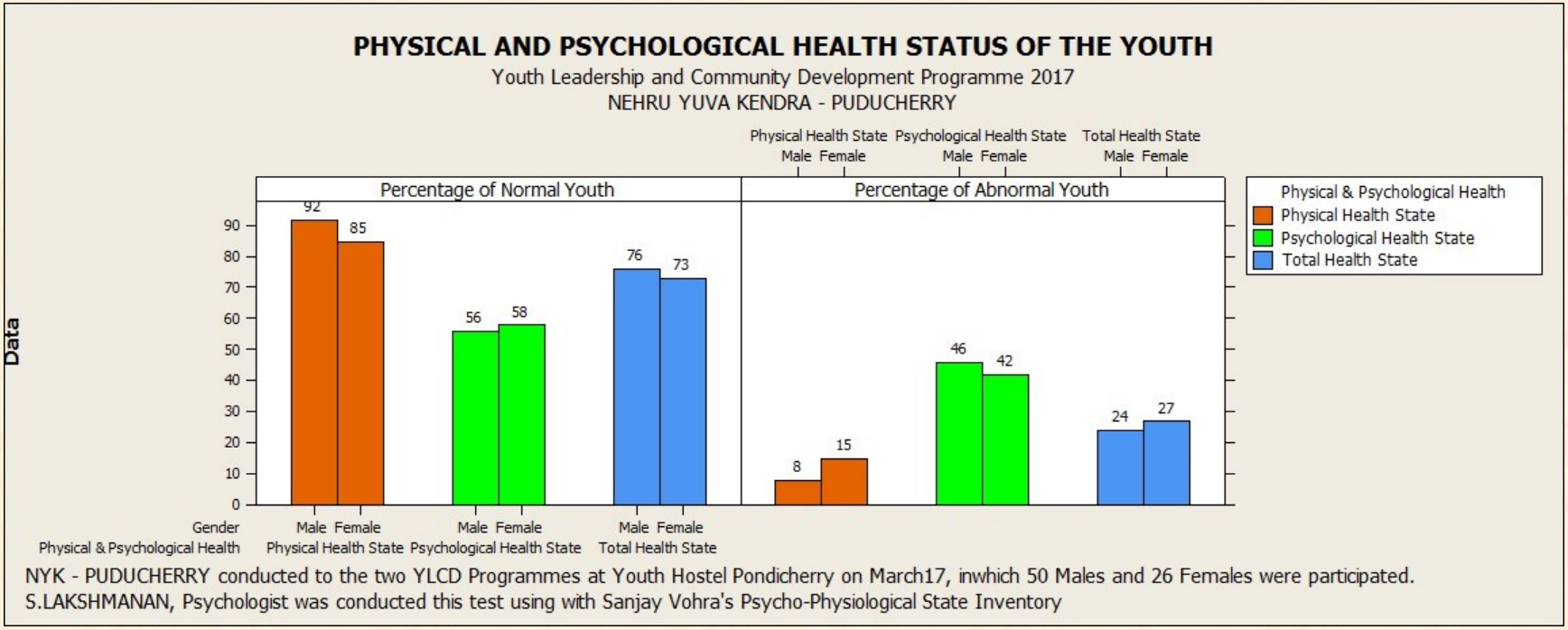
COMPONENT BAR DIAGRAM



BAR DIAGRAM

- Sometimes, the variable is capable of being sub-divided into two or three components part each representing a sub-variable. The bars are now sub-divided proportionately by lines into parts and marked in different colours to distinguish the component parts/ the resulting diagram is known as a *Component Bar diagram*.

Percentage Bar Diagram



PERCENTAGE BAR DIAGRAM

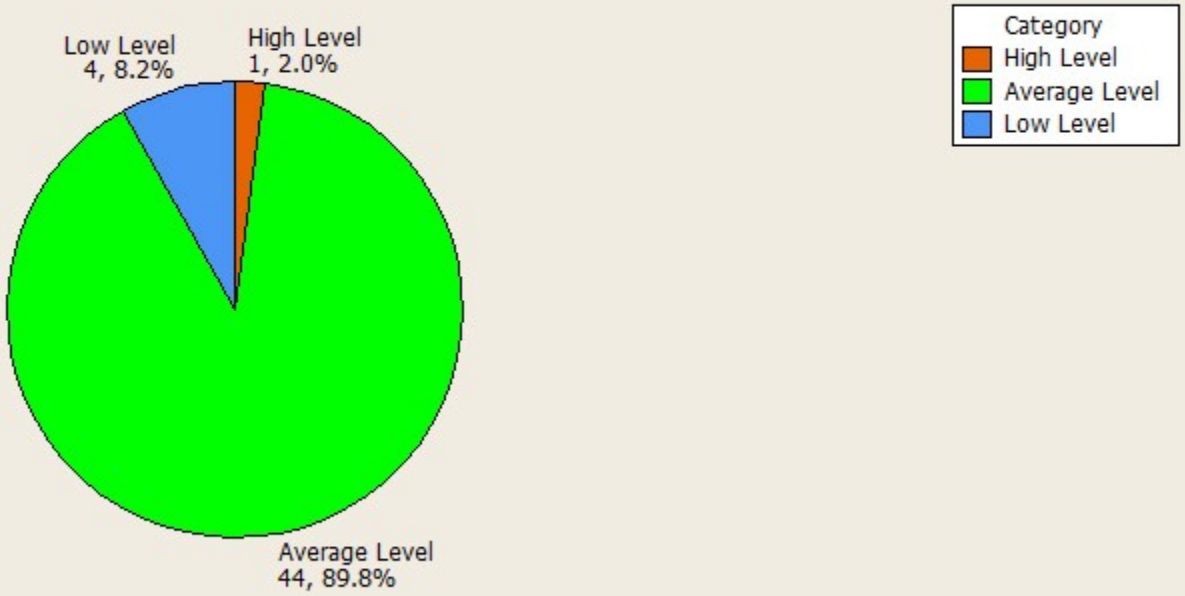
- If all the variables along with their component parts are to be compared, the best way of presentation would be to reduce the total magnitude of each variable to 100 and calculate each component part a percentage. The diagram will now consist of bars of the same length and width. The diagram is known as a *percentage bar diagram*.

PIE DIAGRAMS

STUDY OF ACHIEVEMENT MOTIVATION LEVEL

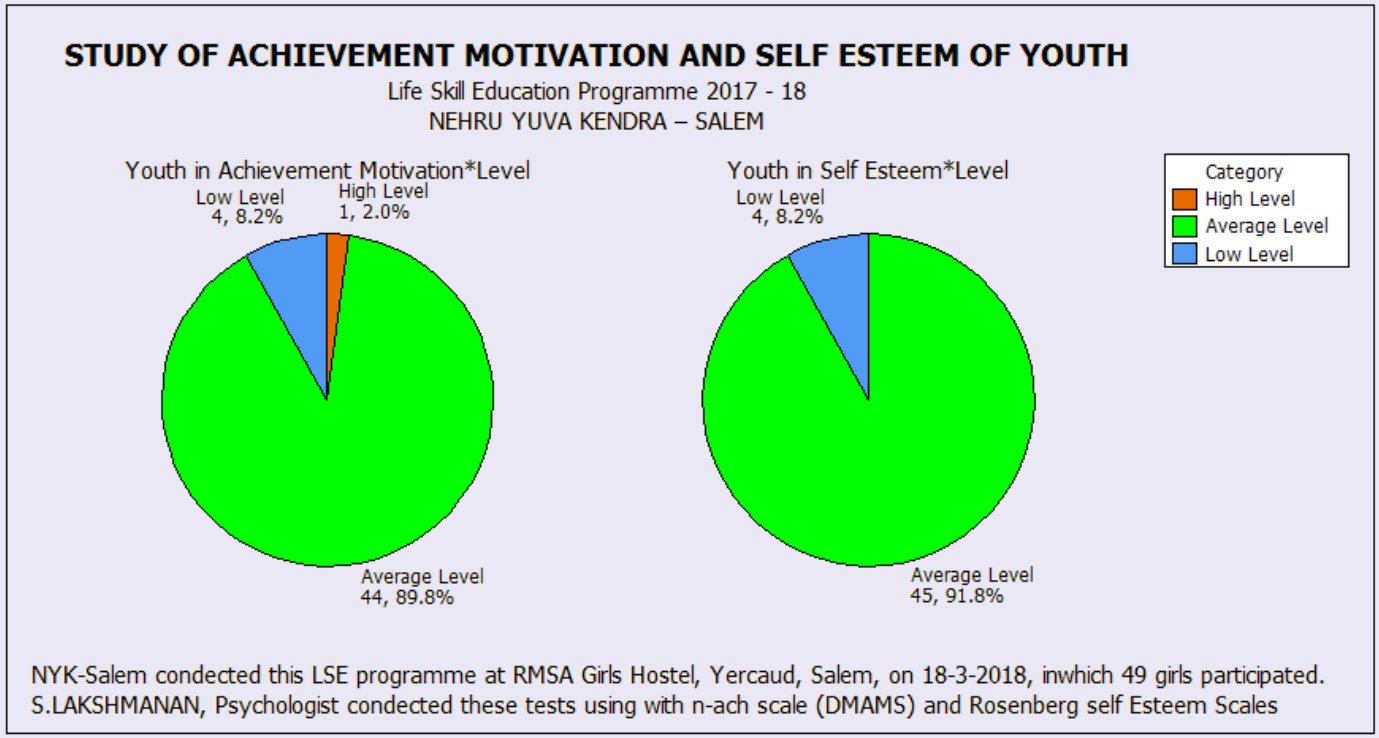
Life Skill Education Programme 2017 - 18

NEHRU YUVA KENDRA – SALEM



NYK-Salem condected this LSE programme at RMSA Girls Hostel, Yercaud, Salem, on 18-3-2018, inwhich 49 girls participated.
S.LAKSHMANAN, Psychologist condected this test using with Deo-Mohan Achievement Motivation (n-Ach) scale.

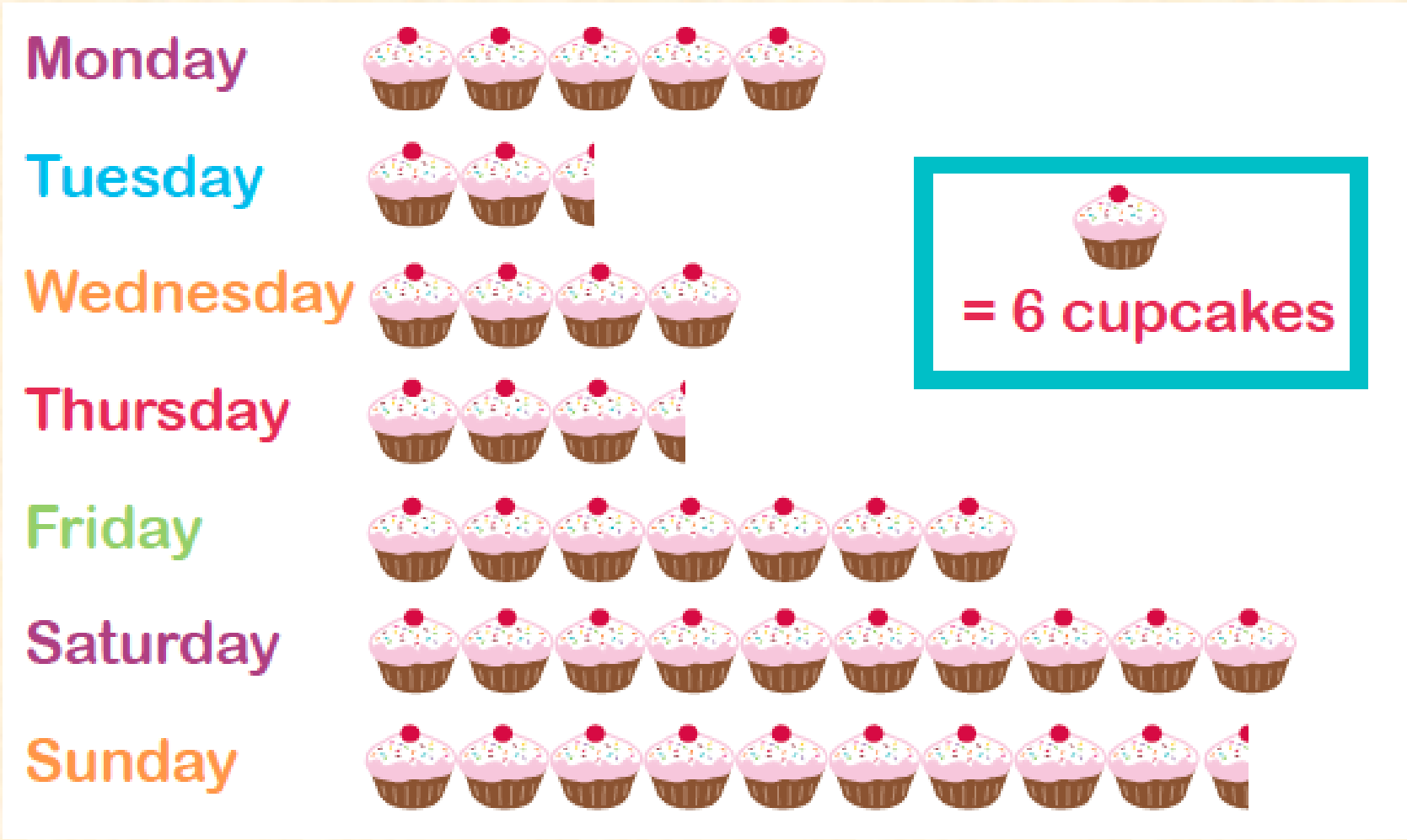
PIE DIAGRAMS


STUDY OF ACHIEVEMENT MOTIVATION AND SELF ESTEEM OF YOUTH
Life Skill Education Programme 2017 - 18
NEHRU YUVA KENDRA – SALEM
Youth in Achievement Motivation*Level
Low Level
4, 8.2%
High Level
1, 2.0%
Average Level
44, 89.8%
Youth in Self Esteem*Level
Low Level
4, 8.2%
Average Level
45, 91.8%
Category
High Level
Average Level
Low Level
NYK-Salem condected this LSE programme at RMSA Girls Hostel, Yercaud, Salem, on 18-3-2018, inwhich 49 girls participated.
S.LAKSHMANAN, Psychologist condected these tests using with n-ach scale (DMAMS) and Rosenberg self Esteem Scales

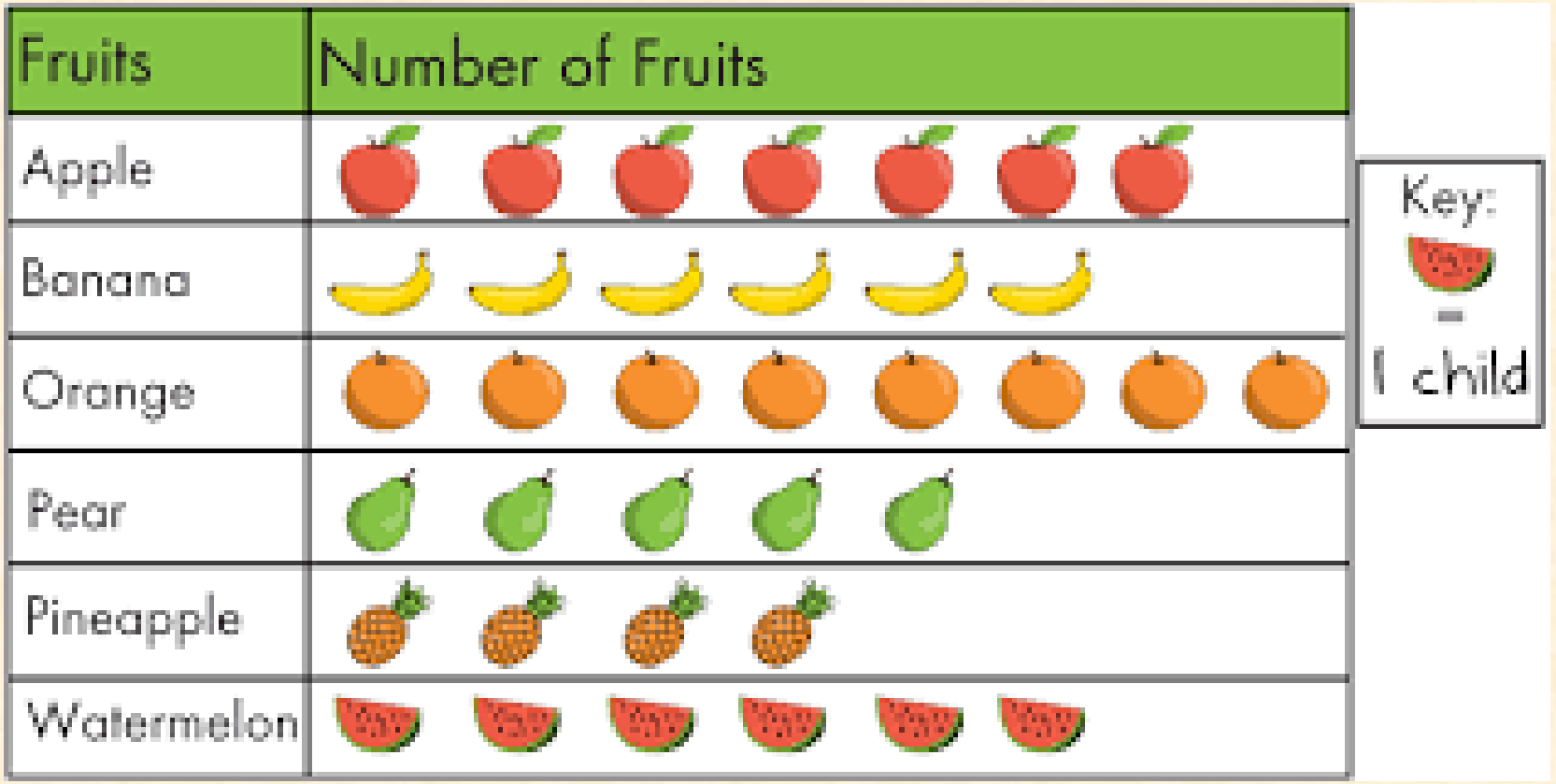
PIE DIAGRAMS

- Instead of representing the variables by means of bar diagram we can represent them by means of Pie diagrams. These diagrams consist of circles whose areas are proportional to the magnitude of the variables they represent. The radii of theses circles is proportional to the square root of the magnitudes of the variables they represent. The component parts of the variables are then represented by means of sectors of these circles. The areas of the sectors are proportional to the magnitudes of these components parts. If the component parts are all expressed as percentages of the whole, we get a percentage pie diagram. In this diagram all the circles representing the different variables are of the same radii. Each of these circles is then divided into sectors showing the component parts.
- Pie diagrams are less preferable to bar diagrams since (1) it is easy to draw sub-divided rectangles than to draw sectors and (2) the lengths of the sub-divisions of a rectangle or bar are measurable on the scale showing percentages, and are comparable directly only in terms of angles. However circular diagrams are more appealing to the eye than other diagrams.

PICTOGRAM


Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
Sunday
= 6 cupcakes

PICTOGRAM


Fruits
Number of Fruits
Apple
Banana
Orange
Pear
Pineapple
Watermelon
Key:
= 1 child

PICTOGRAM

One represents 5 cars

Monday	
Tuesday	
Wednesday	
Thursday	

PICTOGRAM

- A **pictogram** is a chart that uses pictures to represent data. **Pictograms** are set out in the same way as bar charts, but instead of bars they use columns of pictures to show the numbers involved
- A **pictogram** is a stylized figurative drawing that is used to convey information of an analogical or figurative nature directly to indicate an object or to express an idea. **Pictograms** can fulfil many function.

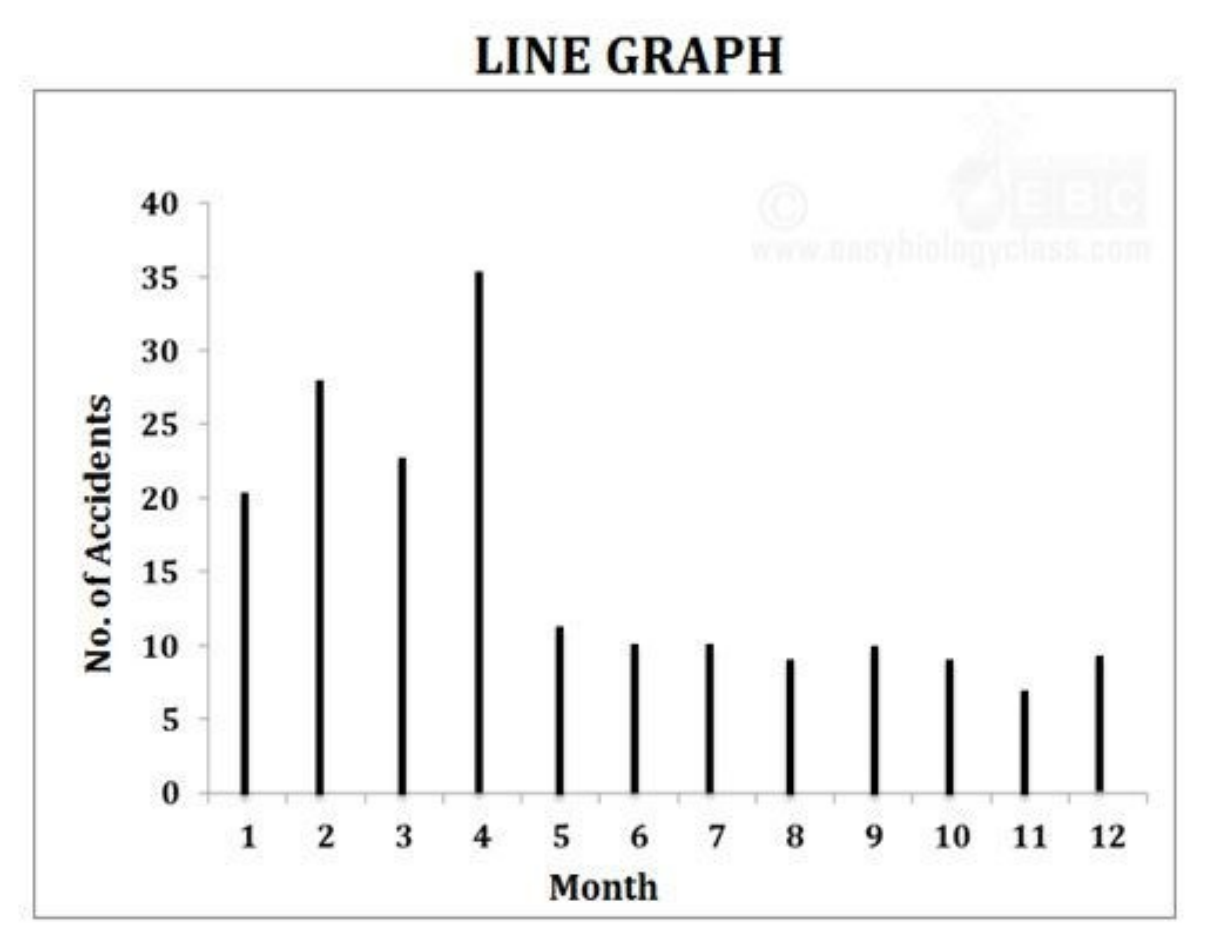
What is a pictogram?

A **pictogram** is one of the simplest (and most popular) **forms** of data visualization out there.

- Also known as “pictographs”, “icon charts”, “picture charts”, and “pictorial unit charts”, **pictograms** use a series of repeated icons to visualize simple data.

FREQUENCY GRAPHS

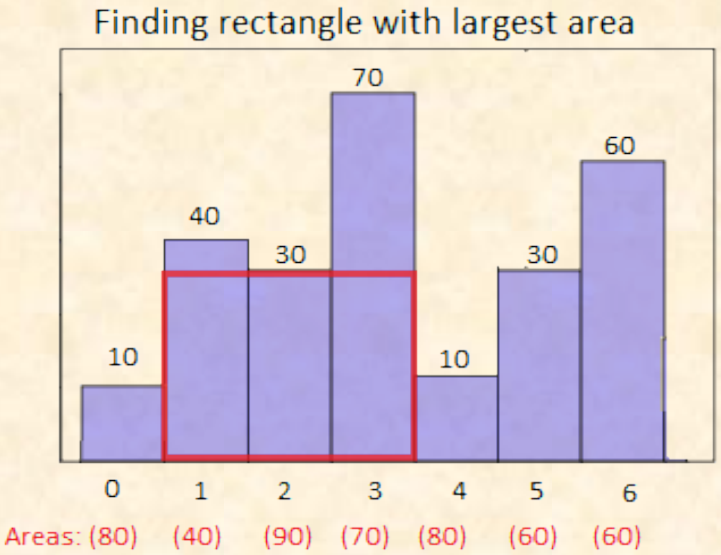
- When a frequency distribution is represented graphically, we get a frequency graph. There are four kinds of frequency graphs. They are (1) the line diagram, (2) the rectangular histogram, (3) the frequency polygon and (4) the frequency curve.

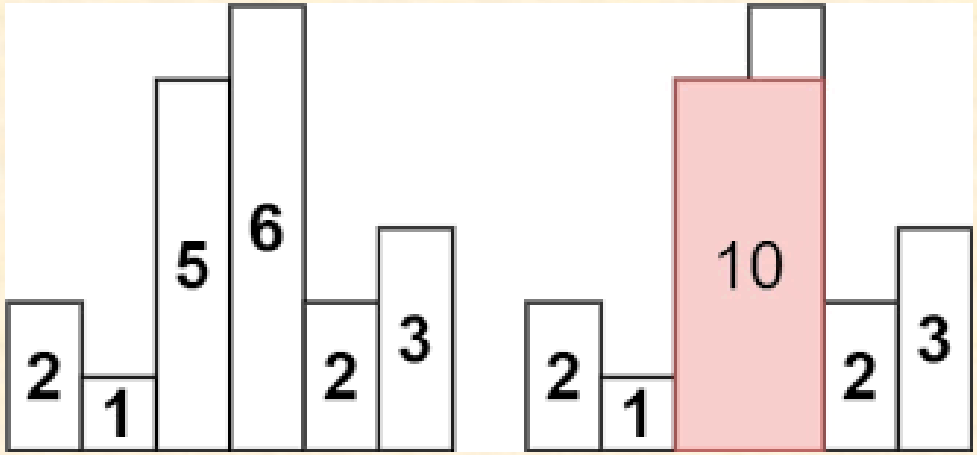

LINE GRAPH
No. of Accidents
40
35
30
25
20
15
10
5
0
1
2
3
4
5
6
7
8
9
10
11
12
Month

LINE DIAGRAM

- *The line diagram*. It consists of number of vertical lines erected over the mid-points of the class intervals, the lengths of the lines being proportional to the mid-points of the class intervals, the lengths of the lines being proportional to the frequencies in the respective classes.

RECTANGULAR HISTOGRAM

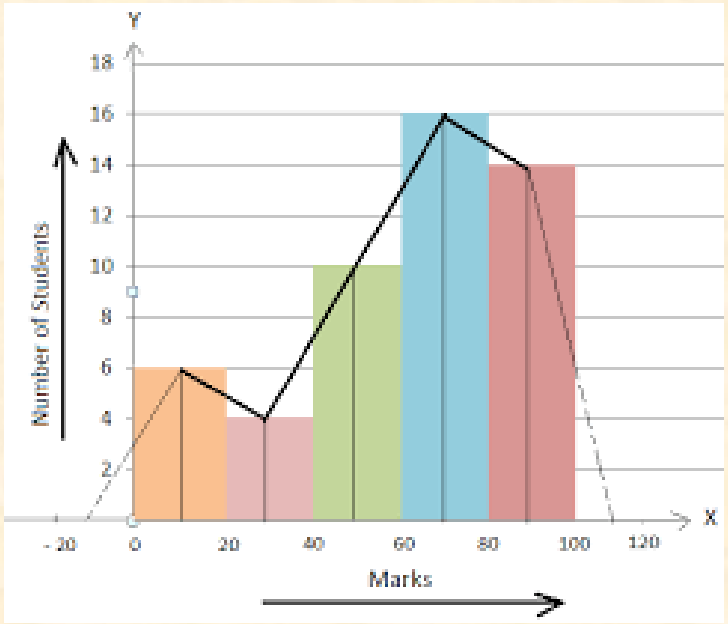


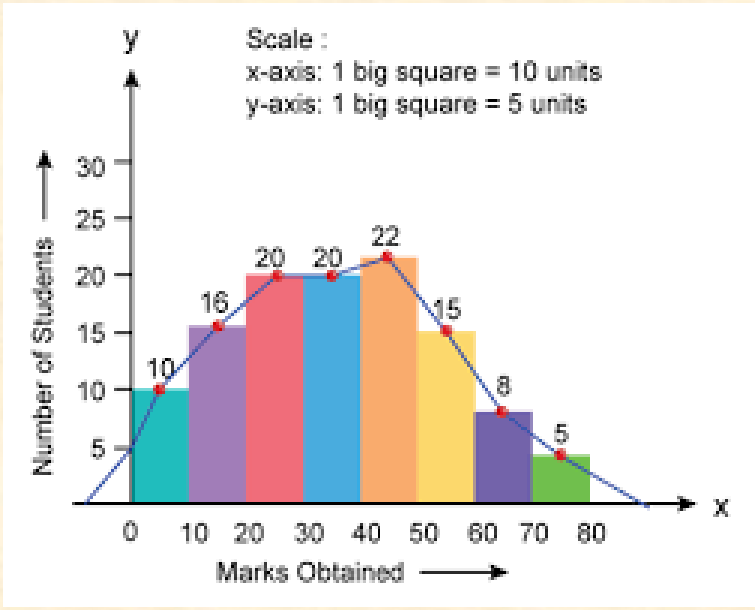


RECTANGULAR HISTOGRAM

- *The rectangular histogram* . It consists of rectangles erected over the true class intervals, the areas of the rectangles being proportional to the frequencies in the respective classes. The widths of the rectangles are each equal to the lengths of the class interval. If the lengths of the class intervals are all equal, the lengths of the rectangles are proportional to the frequencies in the respective classes. The rectangular histogram is similar to a vertical bar diagram without gaps between the bars. This diagram is also known as a column diagram.
-
- If the length of the class interval is taken to be a constant, the entire area of the rectangular histogram would be proportional to the total frequency.

FREQUENCY POLYGON

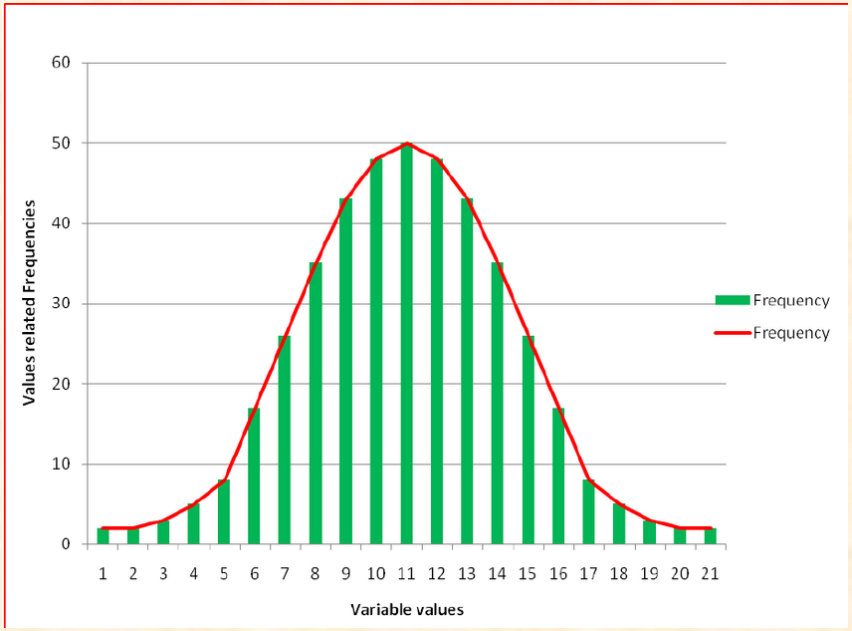


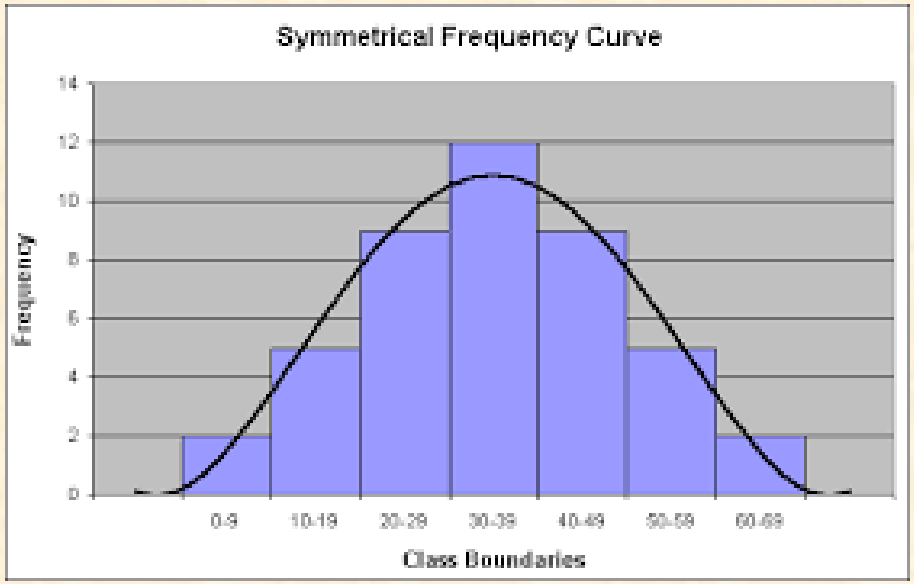


FREQUENCY POLYGON

- *The frequency polygon*. If the tops of the vertical lines drawn in the line diagram are joined by straight lines. We get a frequency polygon. In other words, a frequency polygon is got by joining, by means of straight lines, the points whose coordinates are the mid-values of the class intervals and the corresponding frequencies. The representation is based on the assumption that the frequencies any class are concentrated at the mid-points of the class-intervals. We can make the above assumption without any serious error, provided the class intervals are small.

FREQUENCY CURVE

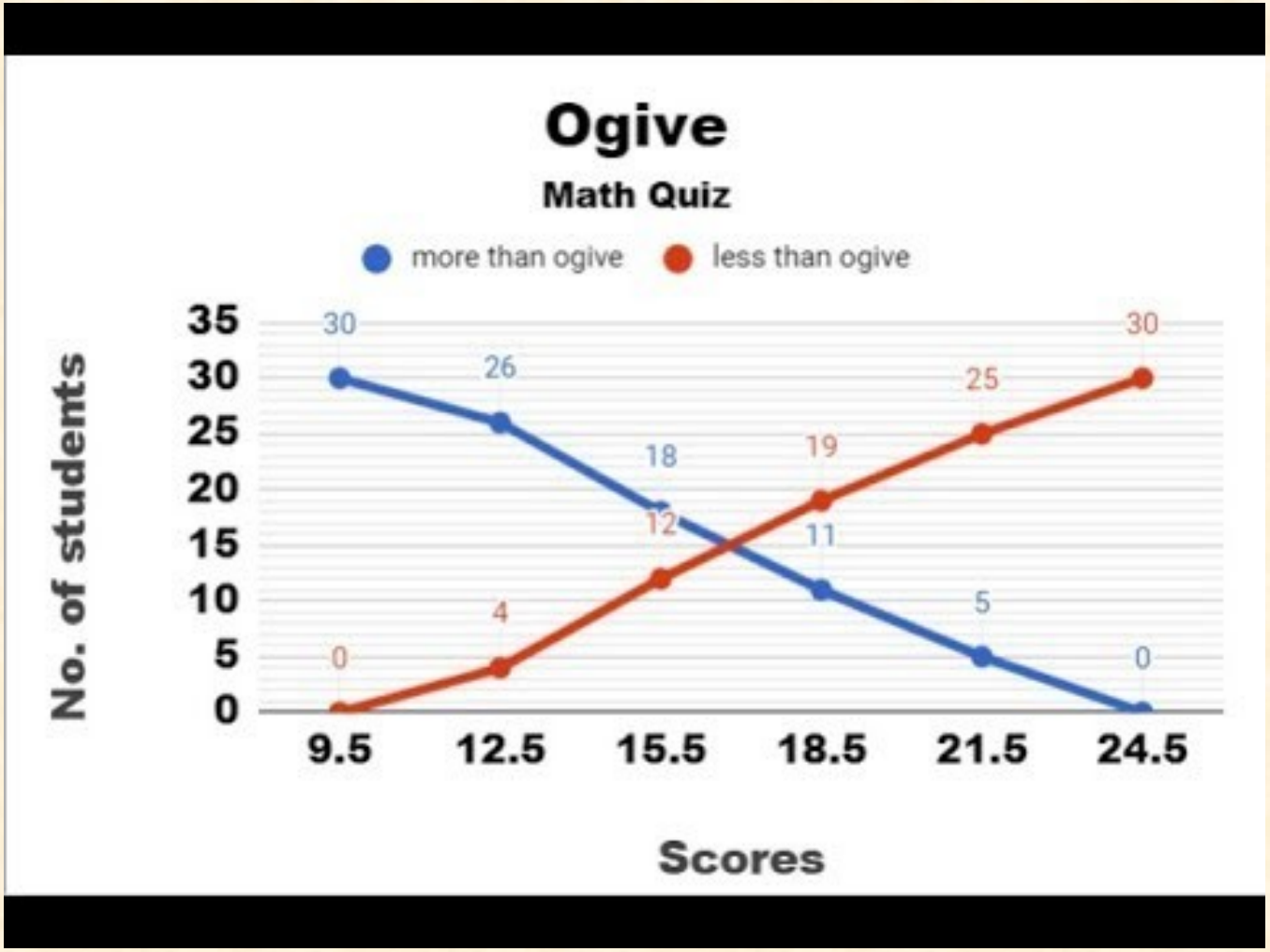




FREQUENCY CURVE

- *The* frequency *curve*. If, instead of joining of tops of the vertical lines in the line diagram by straight lines, we join them by means of a smooth curve, we get a frequency curve. In other words, if we plot the points whose coordinates are the mid-values of the class intervals and the corresponding frequencies and join them by means of a smooth curve we get a frequency curve. Whereas the other frequency graphs describe only the information supplied by the given data. For example, the given data may be only a sample from a population. By studying the frequency curve for the sample, we can have an idea of the population to which the sample belongs. Also the frequency curve enables us to determine the frequency between any two assigned limits since the area of the curve between the two limits is proportional to the total frequency between the two given limits.

OGIVE CURVE


Ogive
Math Quiz
more than ogive
less than ogive
No. of students
35
30
25
20
15
10
5
0
30
26
18
12
11
5
0
0
4
19
25
30
9.5
12.5
15.5
18.5
21.5
24.5
Scores

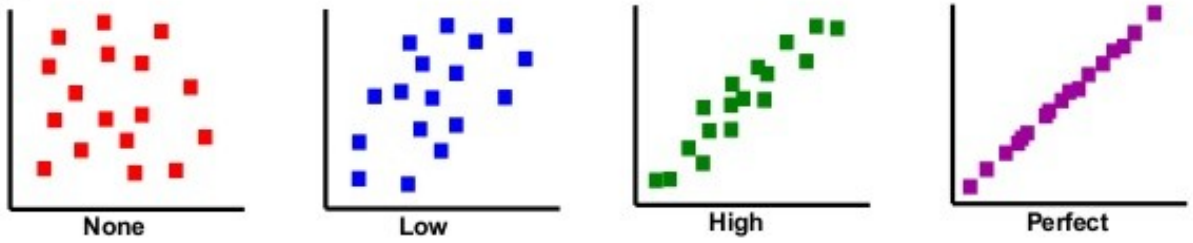
OGIVE CURVE

- The word Ogive is a term used in architecture to describe curves or curved shapes. Ogives are graphs that are used to estimate how many numbers lie below or above a particular variable or value in data. To construct an Ogive, firstly, the cumulative frequency of the variables is calculated using a frequency table. It is done by adding the frequencies of all the previous variables in the given data set. The result or the last number in the cumulative frequency table is always equal to the total frequencies of the variables. The most commonly used graphs of the frequency distribution are histogram, frequency polygon, frequency curve, Ogives (cumulative frequency curves).

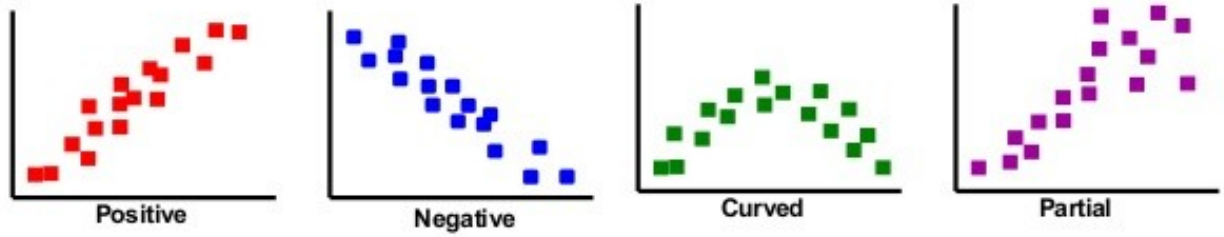
Scatter Diagrame

Scatter Diagram - How do I use it? - Correlation

Degrees of correlation:



Types of correlation:



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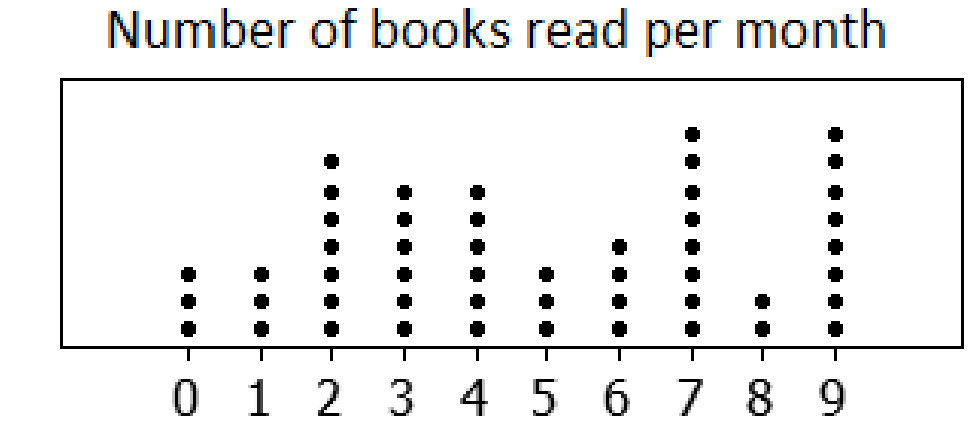
15 July 2010, Slide6

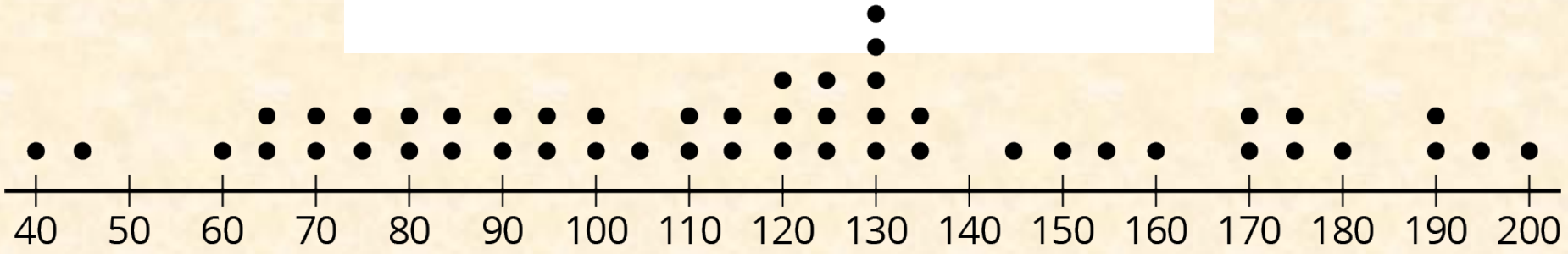
ABB

Scatter Diagrame

- A **scatter diagram** is used to show the relationship between two kinds of data. It could be the relationship between a cause and an effect, between one cause and another, or even between one cause and two others.
- A **scatter plot uses** dots to represent values for two different numeric variables. The position of each dot on the horizontal and vertical axis indicates values for an individual data point. **Scatter plots** are **used to** observe relationships between variables.

DOT PLOT



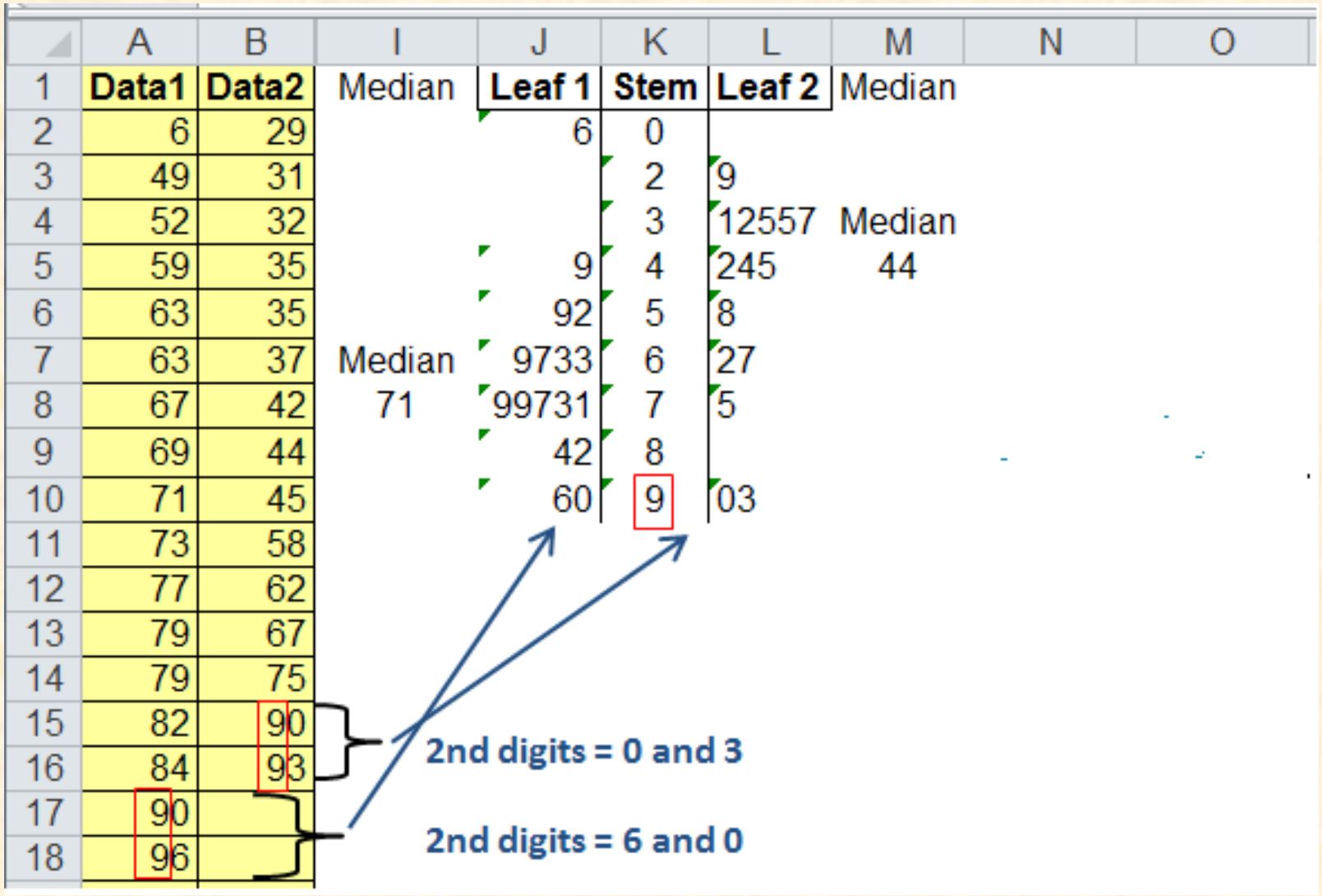


score on a video game

DOT PLOT

- A **dot chart** or **dot plot** is a statistical chart consisting of data points plotted on a fairly simple scale, typically using filled in circles. There are two common, yet very different, versions of the dot chart.
- Dot plots are one of the simplest statistical plots, and are suitable for small to moderate sized data sets. They are useful for highlighting clusters and gaps, as well as outliers. Their other advantage is the conservation of numerical information. When dealing with larger data sets (around 20–30 or more data points) the related stemplot, box plot or histogram may be more efficient, as dot plots may become too cluttered after this point. Dot plots may be distinguished from histograms in that dots are not spaced uniformly along the horizontal axis.

STEM AND LEAF PLOT

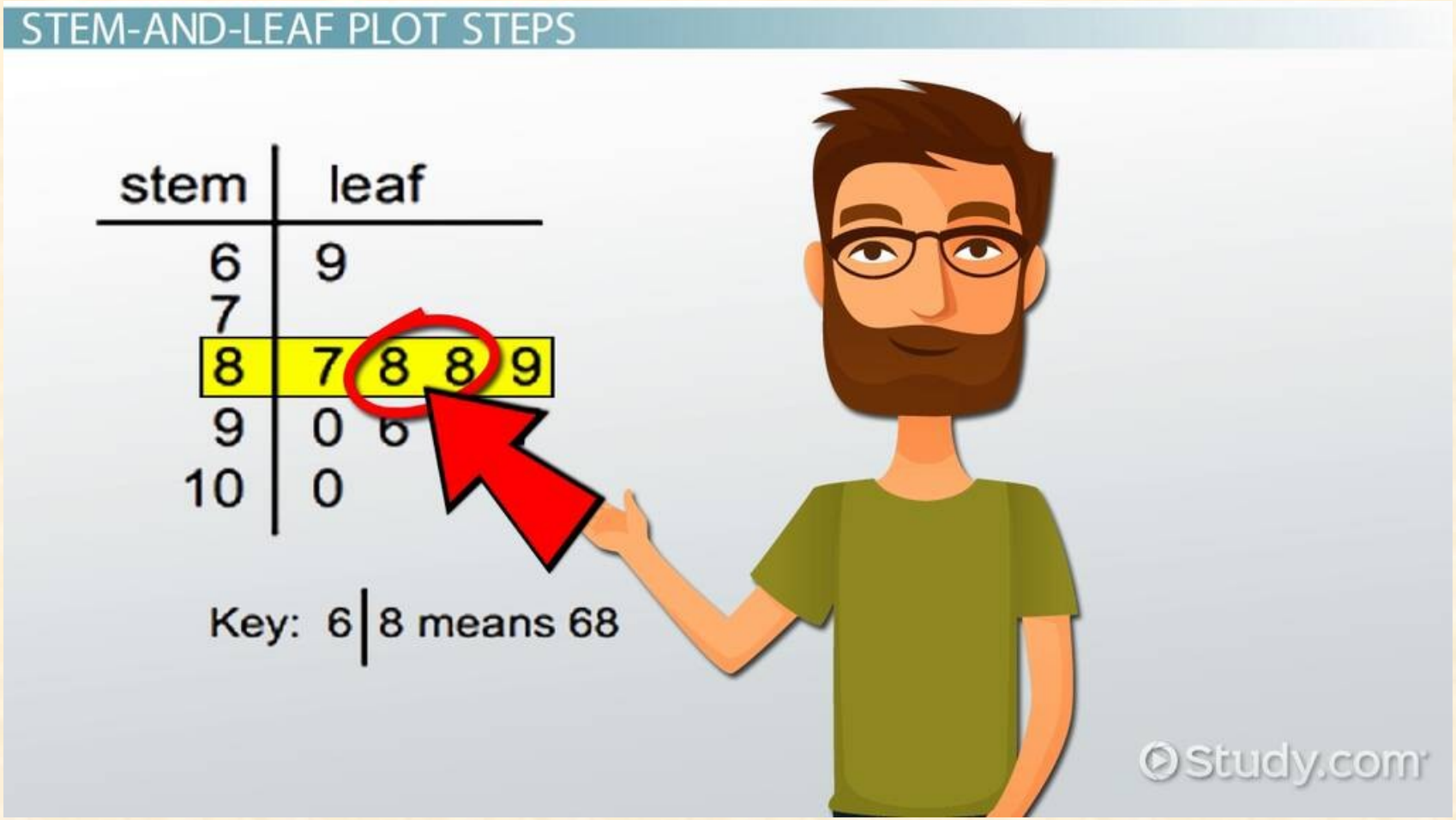


	A	B	I	J	K	L	M	N	O
1	**Data1**	**Data2**	Median	**Leaf 1**	**Stem**	**Leaf 2**	Median		
2	6	29		6	0				
3	49	31			2	9			
4	52	32			3	12557	Median		
5	59	35		9	4	245	44		
6	63	35		92	5	8			
7	63	37	Median	9733	6	27			
8	67	42	71	99731	7	5			
9	69	44		42	8				
10	71	45		60	9	03			
11	73	58							
12	77	62							
13	79	67							
14	79	75							
15	82	90							
16	84	93							
17	90								
18	96								

2nd digits = 0 and 3

2nd digits = 6 and 0

STEM AND LEAF PLOT



STEM AND LEAF PLOT

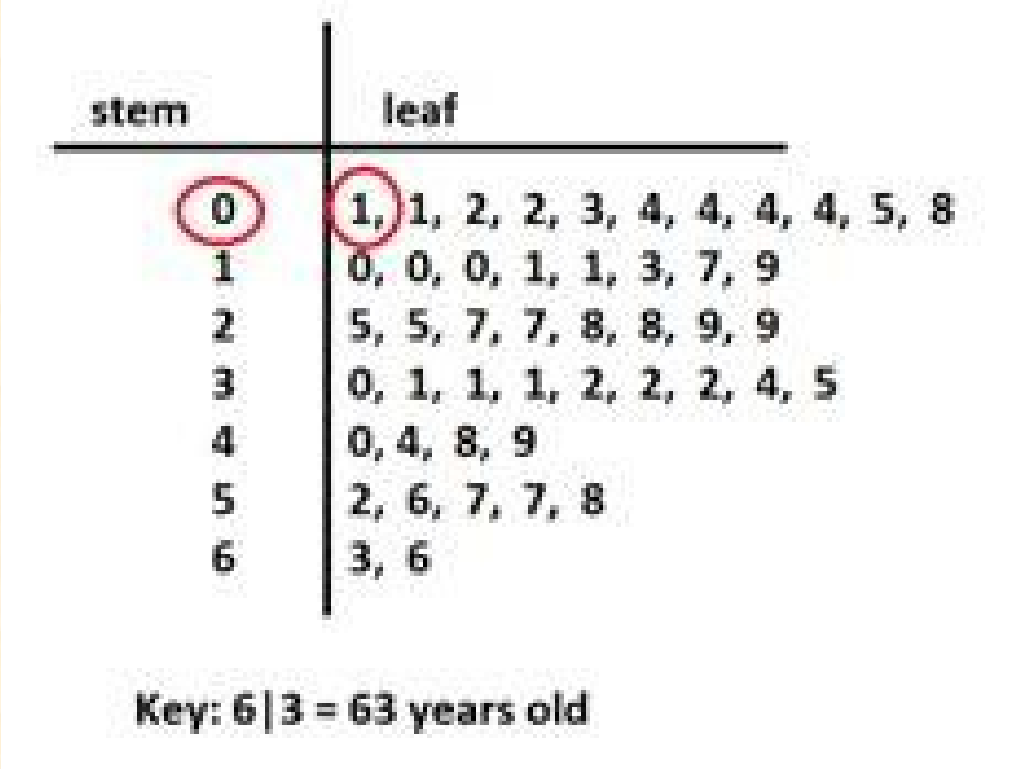
- The Stem and Leaf Plot is an interesting way to showcase data. Check out the example showing ages at a birth day party.

stem	leaf
0	1, 1, 2, 2, 3, 4, 4, 4, 4, 5, 8
1	0, 0, 0, 1, 1, 3, 7, 9
2	5, 5, 7, 7, 8, 8, 9, 9
3	0, 1, 1, 1, 2, 2, 2, 4, 5
4	0, 4, 8, 9
5	2, 6, 7, 7, 8
6	3, 6

Key: 6|3 = 63 years old

STEM AND LEAF PLOT

- We can also see that the youngest person at the party was 01, or 1 year old.



stem	leaf
0	1, 1, 2, 2, 3, 4, 4, 4, 4, 5, 8
1	0, 0, 0, 1, 1, 3, 7, 9
2	5, 5, 7, 7, 8, 8, 9, 9
3	0, 1, 1, 1, 2, 2, 2, 4, 5
4	0, 4, 8, 9
5	2, 6, 7, 7, 8
6	3, 6

Key: 6|3 = 63 years old

STEM AND LEAF PLOT

- When reading a stem and leaf plot, you will want to start with the key. It will guide you on how to read the other values.

  The key on this plot shows that the stem is the

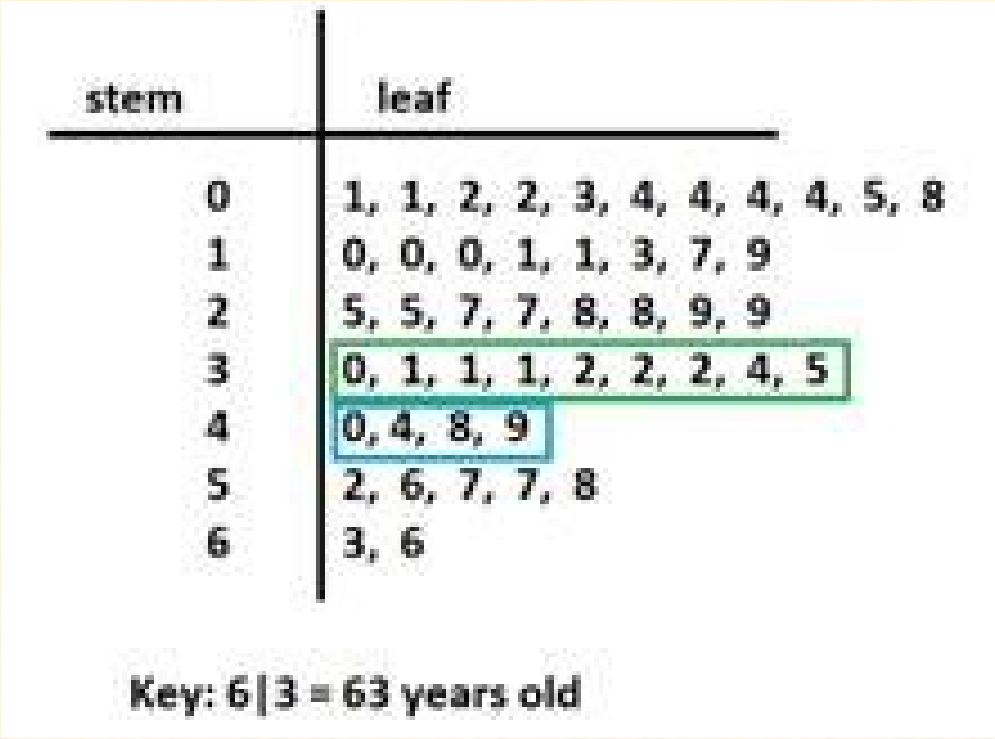
stem	leaf
0	1, 1, 2, 2, 3, 4, 4, 4, 4, 5, 8
1	0, 0, 0, 1, 1, 3, 7, 9
2	5, 5, 7, 7, 8, 8, 9, 9
3	0, 1, 1, 1, 2, 2, 2, 4, 5
4	0, 4, 8, 9
5	2, 6, 7, 7, 8
6	3, 6

Key: 6|3 = 63 years old

STEM AND LEAF PLOT

Stem and leaf plots are similar to horizontal bar graph, but the actual numbers are used instead of bars.

Looking across the rows, we can see that there are 9 people in

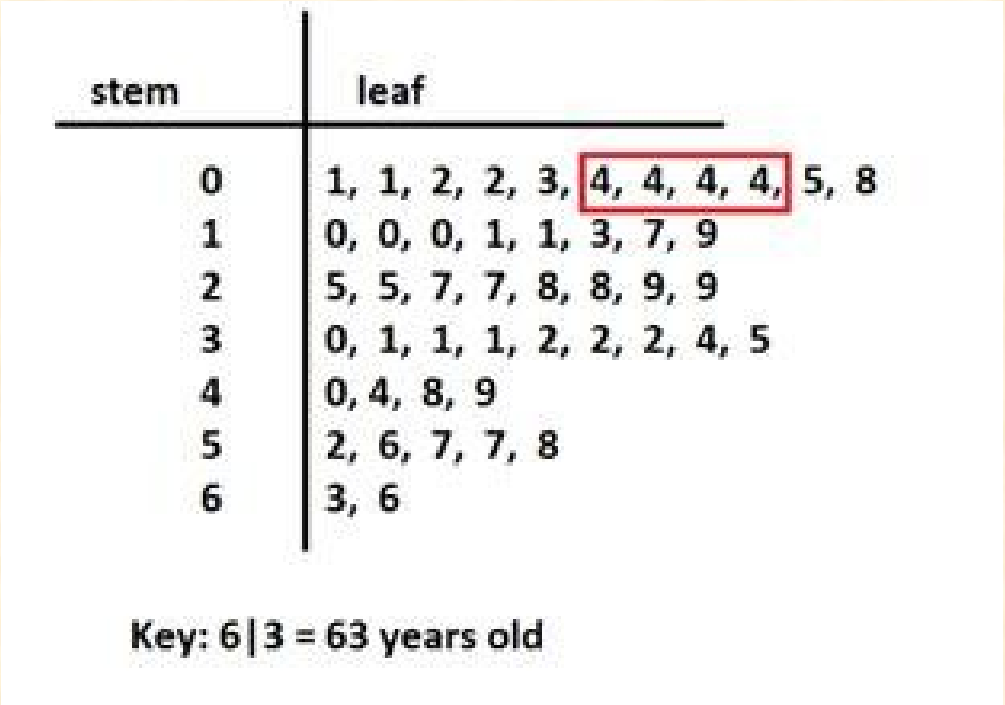


stem	leaf
0	1, 1, 2, 2, 3, 4, 4, 4, 4, 5, 8
1	0, 0, 0, 1, 1, 3, 7, 9
2	5, 5, 7, 7, 8, 8, 9, 9
3	0, 1, 1, 1, 2, 2, 2, 4, 5
4	0, 4, 8, 9
5	2, 6, 7, 7, 8
6	3, 6

Key: 6|3 = 63 years old

STEM AND LEAF PLOT

With the numbers ordered on the leaf side of the plot, we can also see that there are 4 children that are 4 years old. This represents the mode because it is the age that appears the most.



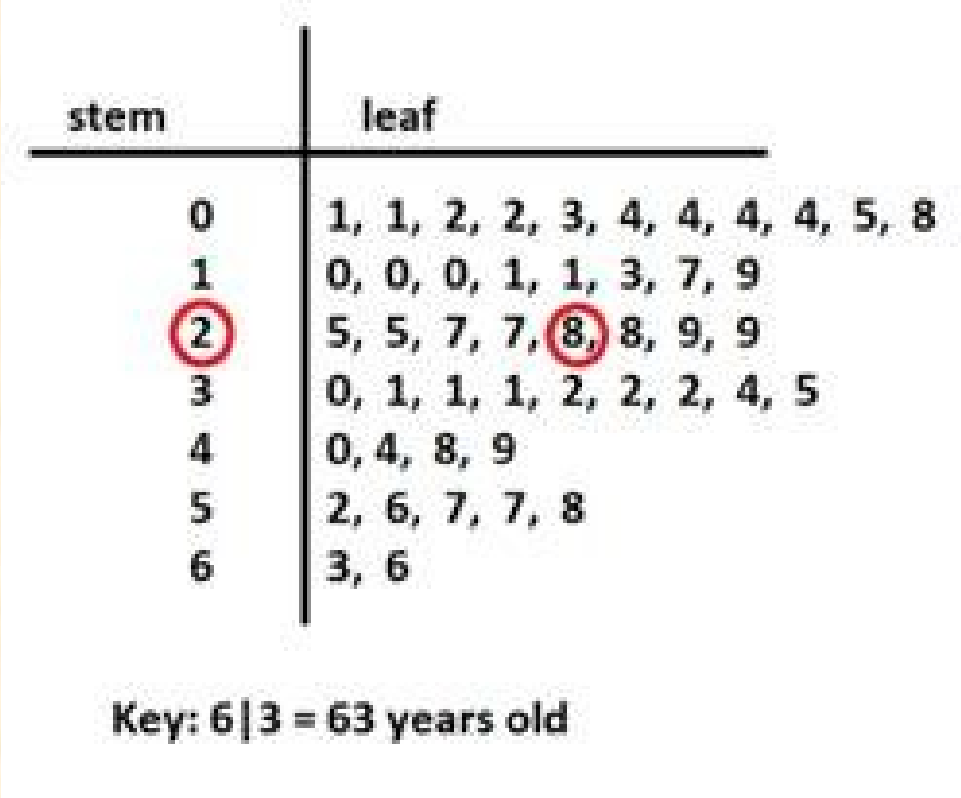
stem	leaf
0	1, 1, 2, 2, 3, 4, 4, 4, 4, 5, 8
1	0, 0, 0, 1, 1, 3, 7, 9
2	5, 5, 7, 7, 8, 8, 9, 9
3	0, 1, 1, 1, 2, 2, 2, 4, 5
4	0, 4, 8, 9
5	2, 6, 7, 7, 8
6	3, 6

Key: 6|3 = 63 years old

STEM AND LEAF PLOT

We can also easily get the median be finding the middle of the leaves. Here we can see that the median is 28 years old. So half the guests are younger than 28 and half are older than 28.

Stem and leaf plots are a great way to visually see what age groups are at the party. What is even better, is that after you get the quick visual, you have the actual values in the plot to work with as

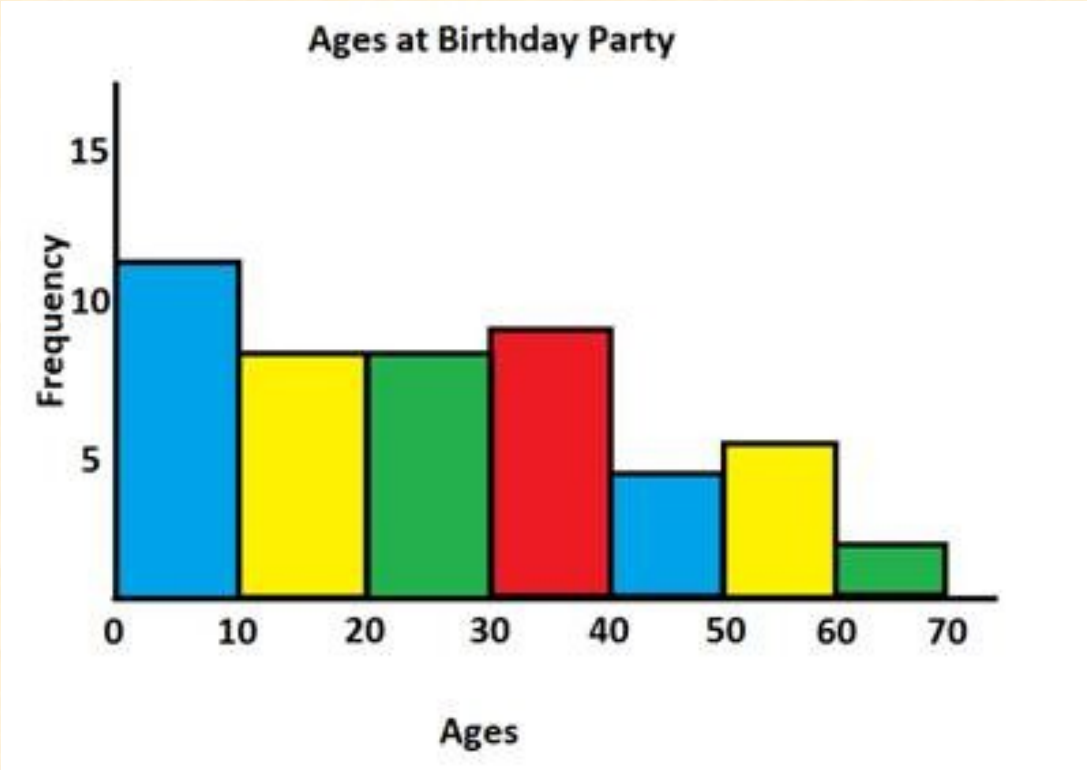


stem	leaf
0	1, 1, 2, 2, 3, 4, 4, 4, 4, 5, 8
1	0, 0, 0, 1, 1, 3, 7, 9
2	5, 5, 7, 7, 8, 8, 9, 9
3	0, 1, 1, 1, 2, 2, 2, 4, 5
4	0, 4, 8, 9
5	2, 6, 7, 7, 8
6	3, 6

Key: 6|3 = 63 years old

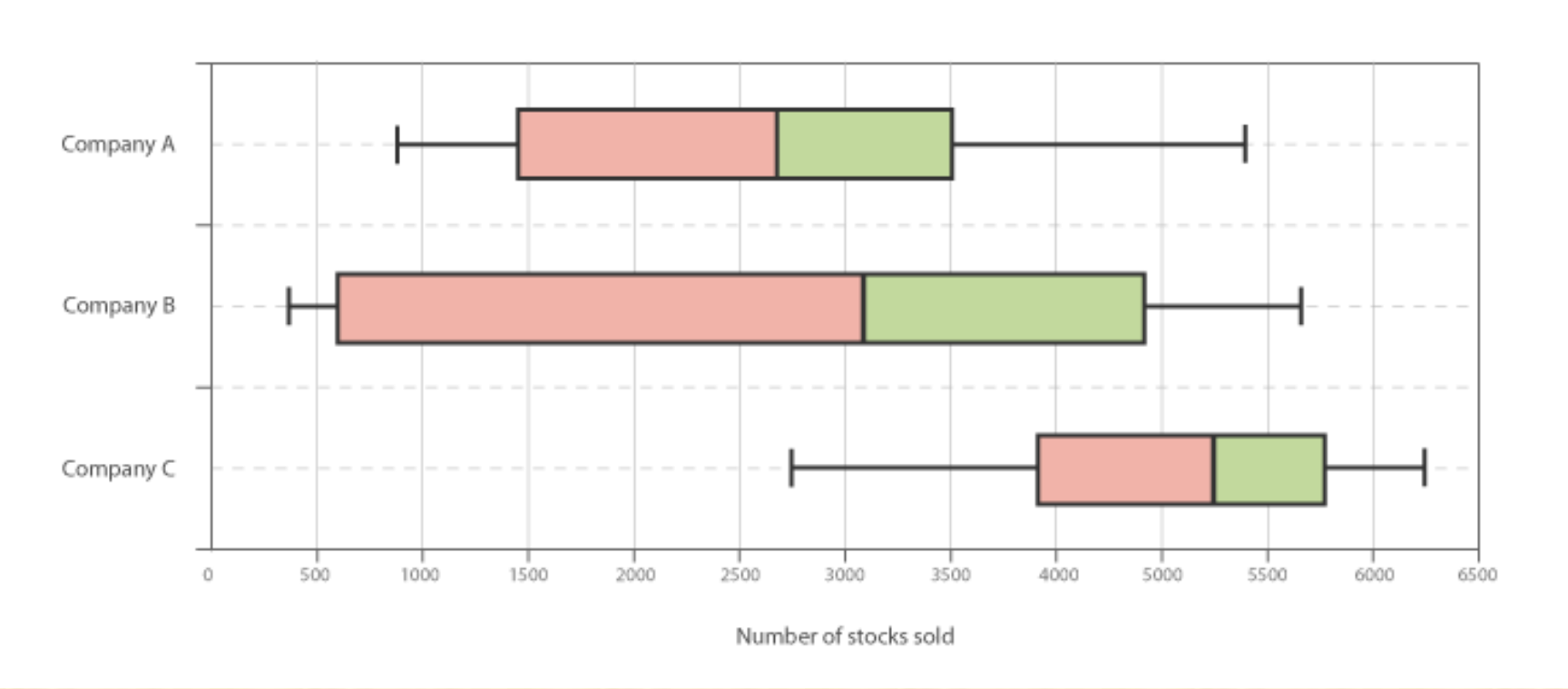
STEM AND LEAF PLOT

A stem and leaf plot can quickly be turned into a histogram as well to show the data using bars.

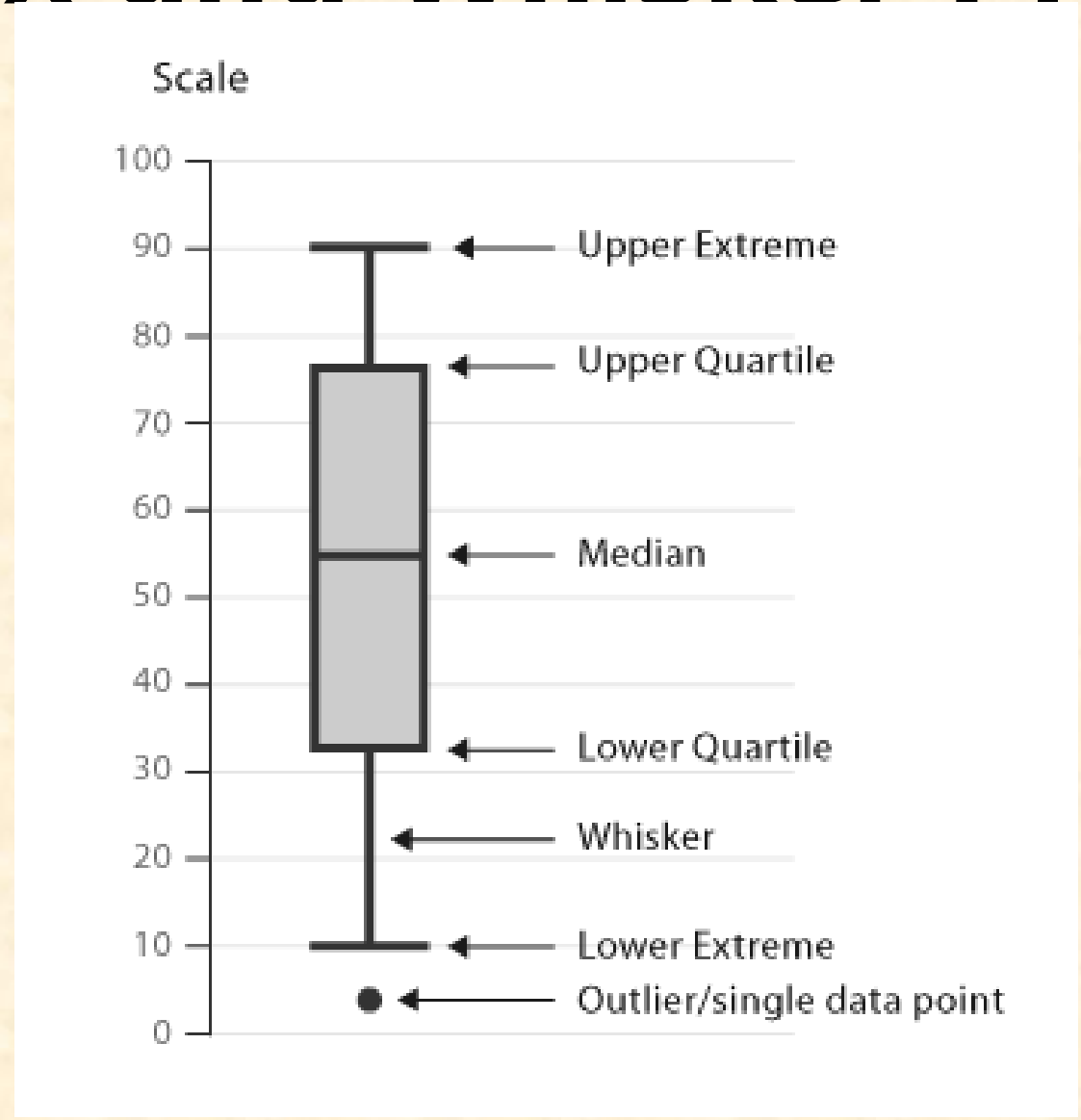


Recall that a histogram shows the data in intervals. The intervals would be

Box and Whisker Plot



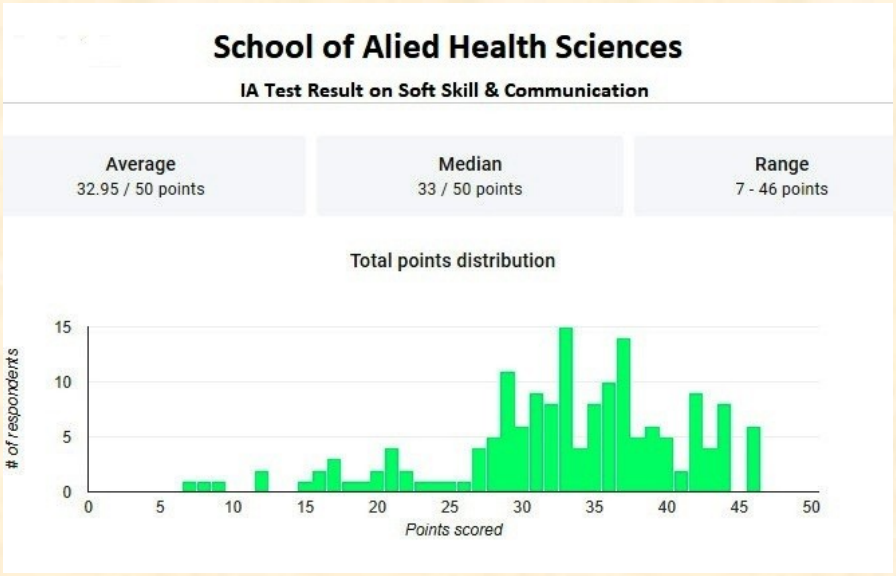
Box and Whisker Plot

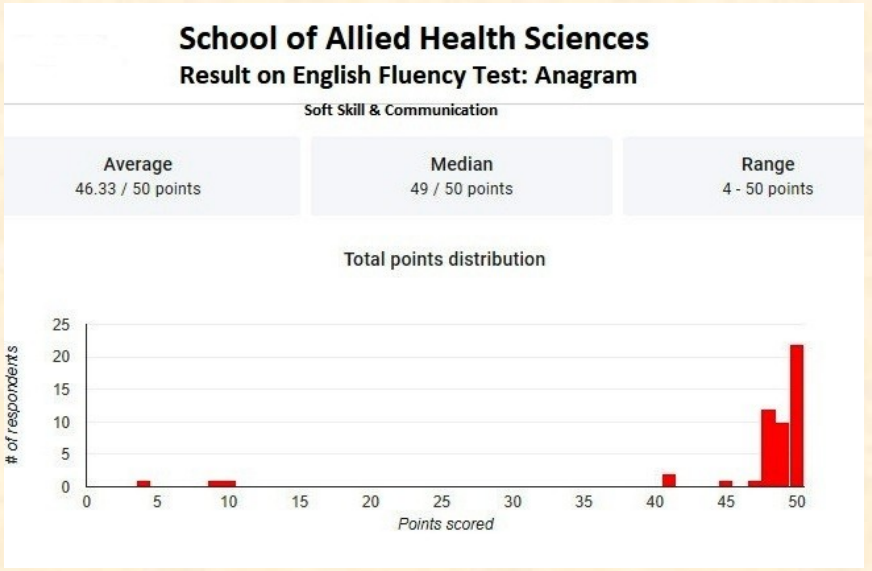


Box and Whisker Plot

- **Description**
- A Box and Whisker Plot (or Box Plot) is a convenient way of visually displaying the data distribution through their quartiles.
- The lines extending parallel from the boxes are known as the “whiskers”, which are used to indicate variability outside the upper and lower quartiles. Outliers are sometimes plotted as individual dots that are in-line with whiskers. Box Plots can be drawn either vertically or horizontally.
- Although Box Plots may seem primitive in comparison to a Histogram or Density Plot, they have the advantage of taking up less space, which is useful when comparing distributions between many groups or datasets.
- Here are the types of observations one can make from viewing a Box Plot:
- What the key values are, such as: the average, median 25th percentile etc.
- If there are any outliers and what their values are.
- Is the data symmetrical.
- How tightly is the data grouped.
- If the data is skewed and if so, in what direction.
- Two of the most commonly used variation of Box Plot are: variable-width Box Plots and notched Box Plots

Compare of Two Tests





Thank You